

REMARKS/ARGUMENTS

Claims 20 and 23 are being amended in response to a claim objection and to the rejection of claims 20-25 under 35 U.S.C. §112, second paragraph. Reconsideration of this application in view of those amendments and the following remarks is respectfully requested.

The method of the present invention provides a solution to the problem of cell deformation that can arise in honeycomb extrudate pieces during drying and/or firing, such misalignment typically resulting in a failure of the extruded products to meet increasingly tight tolerances for cell alignment (paragraph [0003] of the specification). More particularly, the invention addresses the problem of shape deformation arising in wet cellular substrate extrudate sections, due to the fact that the extruded material is quite soft and easily deformed by handling, or even by gravitational sagging, after it is extruded and until it is fired

The Applicants have found that, if absolute vertical/horizontal alignment of the cell structure of the extrudates is maintained, sagging and other deformation of the extrudate are reduced or eliminated (paragraph [0029] of the specification). Thus the Applicants prescribe multiple steps to detect and correct wet extrudate misalignments that can arise during the extrusion, cutting, and transport of the wet extrudate to a dryer, which steps solve an important problem of uneven extrudate product quality.

Referring more particularly to these steps as set out in claim 20 of the application, a reference mark is first applied to wet cellular extrudate as it is extruded onto a support (paragraph [0021] of the specification), corkscrew deformation revealed by mark misalignment is corrected prior to cutting into sections (paragraphs [0020] and [0023] of the specification), the reference mark on the cut sections of extrudate is again optically read, and any misalignment of the sections again corrected (paragraphs [0025]-[0026] of the specification).

Thereafter, the cut sections of extrudate are transferred to dryer trays (paragraphs [0027]-[0028] of the specification), and the ends of the cut extrudate sections are imaged again while in place on the dryer trays for comparison to a target range for alignment on the trays. Misaligned extrudate pieces can at that stage be rejected (paragraph [0029] of the specification).

Claims 20 and 25 of the application stand rejected under 35 U.S.C. §103 as unpatentable over a combination of four references, i.e., U.S. Patent No. 5,205,991 (Avery)

taken with U.S. Patent No. 5,431,866 (DeMasters), U.S. Patent No. 2,352,442 (Loewy), and U.S. Patent No. 4,319,840 (Kondo). That rejection is respectfully traversed.

Avery is cited to show the steps of extruding plasticized ceramic extrudate, (c) cutting the extrudate to form cut sections, (d) floatingly supporting the sections on an air bearing, and (f) transferring the cut sections of extrudate laterally via frictional force to a dryer tray. The Examiner is correct that Avery shows steps (c) and (d) above, but step (f) of transferring the cut sections of extrudate laterally via frictional force to a dryer tray is neither shown nor suggested.

The Examiner's belief that frictional force is inherent in the carrier of Avery is not relevant to step (f) of claim 20, or to the patentability of claims 20 and 25. Claim 20 requires "transferring the cut section of the extrudate laterally via frictional force to a dryer tray"; it does not require that the tray (carrier) itself offer friction. As the Applicants disclose in paragraph [0028] of the specification, the transfer of cut sections of extrudate to a dryer tray is suitably be carried out through frictional force applied by pads 116 (Fig 6) to move segment 18 along an air bearing support 60 to dryer tray 124. Avery (Fig 1.) neither discloses nor suggests any application of frictional force to move cut extrudate section 17 along air bearing support chambers 12 to carrier 20. Thus step (f) as recited by the Examiner is absent from Avery.

Avery further fails to support prima facie obviousness because it neither discloses nor suggests the problem discovered and solved by the Applicants. The Avery invention is from the same field of art as the invention of claims 20 and 25, and is clearly the closest in subject matter to the invention. However, Avery addresses only the problem of skin fissures in cellular extrudate pieces (column 1, lines 13-21 of the patent); no steps or features for maintaining the vertical/horizontal alignment of the cell structure of the extrudate to maintain extrudate shape, or for inherently achieving that result, are disclosed.

The Examiner acknowledges the failure of Avery to disclose any of the other material steps of the claimed process, e.g., applying a reference mark to a plasticized extrudate as the extrudate exits an extrusion die onto an extrudate support; correcting corkscrew deformation of the extrudate exiting the extrusion die in response to a reference mark misalignment, taking an optical reading of the reference mark on a cut section of the extrudate as it is floatingly supported on an air bearing, correcting misalignment of the reference mark from a predetermined reference point; and after frictionally moving the cut section to a dryer tray, imaging an end of the cut section of the extrudate on the dryer tray and comparing the image

with a target range for alignment. The Examiner therefore reconstructs the invention from the teachings of three additional patents, including some from fields of art having little or no applicability to the production of cellular substrates from soft plasticized ceramic batches.

DeMasters was cited by the Examiner to suggest the steps of applying a reference mark to an extrudate and correcting for corkscrew deformation of the extrudate in response to a reference mark misalignment. However, DeMasters fails to teach or suggest the correction of corkscrew deformation in plasticized extrudate via skewed, elastically deformable rollers that are necessary to prevent deformation of the extrudate. For soft, wet, plasticized extrudate such as processed in accordance with the Applicants' invention, which extrudate can be deformed even by gravitational sagging, the Applicants' method step of successfully correcting extrudate corkscrew deformation via skewed deformable rollers that avoid damage to the surface of the extrudate is not obvious from DeMasters' use of guide rollers that snugly grip and twist plastic pipe.

The ready susceptibility of soft cellular extrudates to handling and gravitational deformation makes apparent the criticality of the Applicants steps of floatingly supporting the cut sections of extrudate on an air bearing while correcting horizontal/vertical cell misalignments of those cut sections. The Examiner cites DeMasters' correction of corkscrew deformation in continuously extruding plastic pipe as suggestive, but also notes DeMasters' failure to teach the realignment of cut extrudate sections. He thus relies on Loewy, lines 10-17 of page 1 and Figs. 3 and 4, to show the conventionality of cut section realignment. (The Applicants' requirement for air bearing support during section realignment is not addressed by either of DeMasters or Loewy).

Loewy teaches apparatus for correcting twisting in sections of extruded flanged metal bar. There is no disclosure of a method or apparatus for correcting the alignment of those bar sections with reference to any mark, whether prior or subsequent to the correction of bar twist, nor would such alignment correction be required for the successful processing of solid metal bars. Plainly, Loewy is from a field of art (metal beam extrusion) that would not be consulted by an artisan attempting to correct cellular extrudate deformation, nor would the metal gripping and twisting machinery and methods employed by Loewy have any obvious or discernable applicability to the handling of easily deformed plasticized cellular extrudate, were that reference for some reason consulted.

The Examiner next cites Kondo to suggest the Applicants' step of imaging an end of a cut section of extrudate on a dryer tray and comparing the image with a target range for

horizontal/vertical alignment of the extrudate cell structure. Clearly, however, Kondo neither teaches nor suggests any method or apparatus for correcting extrudate misalignment on a dryer tray, nor is the imaging of a cut section of extrudate disclosed.

The method and apparatus of Kondo are designed to identify and reject cellular substrates having blocked cells or defective cell walls traversing an inspection station on a transfer belt. Neither a realignment step, nor a target range for substrate realignment, are disclosed or inherently present. Instead, substrates rejected for blocked cells or defective walls are simply removed from the belt.

Further Kondo does not image an end of a substrate in accordance with the Applicants' method, but instead images a screen (3) upon which diffuse light traversing the open cells is projected. Thus Kondo clearly fails to teach or suggest the cut-end-imaging and vertical/horizontal realignment of a substrate cell structure on a dryer tray to a target alignment range, as the Applicants claims require.

For the above reasons, the combination of Avery, DeMasters, Loewy and Kondo plainly fails to establish a prima facie case for obviousness as to rejected claims 20 and 25 of the application. Accordingly, reconsideration and withdrawal of the rejection of claims 20 and 25 under 35 U.S.C. §103 on reference to that art are respectfully requested.

The Examiner next rejected claim 21 of the application under 35 U.S.C. §103 as unpatentable over the combination of Avery, DeMasters, Loewy and Kondo taken further in view of U.S. Patent No. 4,906,170 to Nelson. Nelson was cited to show the marking of plastic extrudate using an inkjet printer.

Claim 21 of the application is directed at using an ink jet printer to apply a reference mark to extruding cellular substrate that is then used correct corkscrew deformation of the extrudate and to assure horizontal/vertical alignment of the cells of the extrudate during transport on an air bearing. While Nelson utilizes ink jet printing, the printing neither provides a reference mark nor aids in the downstream alignment of the extrudate. To the contrary, the extrudate and inkjet printer of Nelson must be pre-aligned with each other by other means before printing is commenced (column 2, lines 3-15 of Nelson). This is necessary to insure that the ink-jet-applied messages are properly aligned on the plastic extrudate; the marking serves no purpose with respect to extrudate alignment or downstream handling.

For the above reasons, the combination of Avery, DeMasters, Loewy, Kondo and Nelson fails to establish a prima facie case for the obviousness of claim 21 under 35 U.S.C.

§103. Accordingly, reconsideration and withdrawal of the rejection of claim 21 on reference to Avery, DeMasters, Loewy, Kondo and Nelson are respectfully requested.

The Examiner next rejects claims 22 and 23 of the application under 35 U.S.C. §103 as directed to subject matter obvious from the combination of Avery, DeMasters, Loewy, and Kondo taken further in view of U.S. Patent No. 5,222,594 to Sumino. Sumino is cited to show the correction of corkscrew deformation of a tubular form (a conveyor belt) by contact with rollers having pivot axes aligned askew from a tube axis of movement.

The Sumino reference is from a field of art distinct and non-analogous to the field of cellular substrate extrusion, i.e., Class 198, Power-driven conveyors, and is therefore not art that would be consulted by the artisan to solve a problem relating to cellular substrate extrusion. Further, Sumino fails to teach the use of skewed, elastically deformable rollers for realigning cellular extrudate.

The Examiner's observation that all materials (including the Sumino rollers) are elastically deformable does not strengthen the case for obviousness. Clearly steel rollers would not be equivalent to silicone or rubber rollers for the handling of plastically deformable cellular extrudate. In that connection the Examiner has correctly observed that deformable silicone and rubber rollers are known. However, the art relied on in support of this rejection provides no suggestion to use deformable rollers of these materials, whether for conveyor belt transport, for cellular extrudate realignment, or for any other reason. Thus there is nothing in Avery (which is the prior art closest to the invention) to suggest the use of such rollers to handle cellular extrudate at any stage of the process, nor do any of the references cited in support of the rejection offer any reasonable assurance that skewed elastically deformable rollers could be successfully applied to the realignment of soft cellular extrudate in accordance with the claimed method.

For the above reasons, it is respectfully submitted that the subject matter of claim 23 is not taught or suggested by the combination of Avery, DeMasters, Loewy, Kondo and Sumino, and therefore that the rejection of claim 23 under 35 U.S.C. §103 should be reconsidered and withdrawn.

The Examiner next rejected claim 24 of the application under 35 U.S.C. §103 as unpatentable over the combination of Avery, DeMasters, Loewy, and Kondo taken further in view of U.S. Patent No. 5,591,387 to Takeuchi. Takeuchi was cited to show the use of a supporting pad made of a flexibly resilient foam, as at column 3, lines 1-15 of the patent.

The foam pad of Takeuchi is employed to insure a vacuum seal against a green, slip-cast ceramic article such as a washbasin. Takeuchi provides no teaching or suggestion to transport deformable substrates laterally along an air bearing via frictional force provided by such a pad.

Further, as the art is well aware, green slip cast ceramic bodies are both rigid and self-supporting, and thus not subject to gravitational sagging and deformation in the manner of the Applicants' substrates. Certainly resilient pads themselves are not new, but Takeuchi provides suggestion to support the conclusion that such pads could successfully be used to frictionally transport soft and deformable cellular substrates along an air bearing to a dryer tray without damage to the deformable substrates. Nor is such a suggestion provided by any of the other art relied on by the Examiner in support of the rejection of claim 24.

For the above reasons, it is respectfully submitted that the subject matter of claim 24 is not obvious from the combination of Avery, DeMasters, Loewy, Kondo and Takeuchi within the meaning of 35 U.S.C. §103, and therefore that reconsideration and withdrawal of the rejection of claim 24 on that ground would be appropriate.

Turning finally to the Examiner's response to the Applicants' arguments for patentability filed on 14 November 2005, the Examiner holds that acknowledgment of the problem addressed by the invention, and motivation to combine the multiplicity of references in the manner used to support the various rejections, is provided in the references of record. The Examiner is respectfully requested to point out any recognition in any of the references of the particular problem of extruded cellular substrate deformation that has been successfully addressed by the invention. In the Applicants' submission, no reference deals with the handling of any extruded or formed material at any stage of manufacture where it is subject to deformation even from simple gravitational sagging.

That being the case, the Examiner's selection of various features from the seven different references relied on in support of the various rejections, including references that are in some cases completely disconnected from the field of art represented by the invention, may properly be characterized as a hindsight reconstructions of the invention, rather than a selection based upon identifiable suggestions in the references to combine isolated features in the manner employed to support those various rejections.

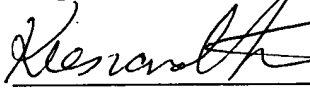
Therefore, in light of the foregoing amendments and remarks, the Applicants respectfully submit that remaining claims 20-21 and 23-25 of this application are now in

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condition for allowance. Accordingly, favorable reconsideration of this application and the issuance of a Notice of Allowance herein are courteously solicited.

The Applicants believe that only a one-month extension of time is necessary to make this Reply timely, but contingently request that the Office grant such further time extension pursuant to 37 C.F.R. § 1.136(a) as is necessary to make this Reply timely, if in fact such a further extension is required. In that contingency the Office is hereby authorized to charge any necessary extension fee or surcharge to the deposit account of Corning Incorporated, Deposit Account 03-3325.

Respectfully submitted,



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